

Our Watershed, Our Water

Traveling the land to our rivers, lakes and drinking glasses

**Chequamegon Bay
Wisconsin**



**Understanding and
Protecting a Watershed**

*The
Nature
Conservancy*
Saving the Last Great Places

All great rivers start as a trickle of water. The trickles come together to form a stream, streams flow together to form a river, and rivers drain into large bodies of water such as lakes or oceans. A watershed consists of groundwater, streams, tributaries, rivers and all of the surrounding land that drains to a common point.

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For many years, America’s drinking water has been safe, plentiful and relatively cheap. We currently consume more than 175 trillion gallons of water a year -- enough to drain Lake Erie and the nation’s 12 largest reservoirs. Often we take it for granted that our water is safe to drink. However, as our wellheads and watersheds come under pressure from changing land uses, the purity of this vital resource is at increasing risk. The United States Center for Disease Control and Prevention estimates that nearly one million Americans become ill every year, 900 of them fatally, because of polluted drinking water.



North American Benthological Society

Acknowledgments

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The expertise, thoughtfulness and wisdom of all of those who contributed comments were indispensable in the evolution of this project. Thank you!

The Nature Conservancy is a global, non-profit conservation organization dedicated to the preservation of plants, animals and natural communities that represent the diversity of life on earth by protecting the lands and waters they need to survive. Supported almost entirely through private, tax-deductible contributions, The Nature Conservancy has more than 25,000 members in Wisconsin and more than one million worldwide. Through a science-based, cooperative approach, The Nature Conservancy works with communities, businesses and individuals to help save the world’s “Last Great Places.”

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You can find a copy of this document at nature.org/wisconsin

Cover Photos include: Front: *Chequamegon Bay Sketch*, Ashland Historical Society; *Historic Boaters*, Ashland Historical Society; *Kids on Dock*, University of Wisconsin-Extension; and *Kakagon Slough Aerial*, Jim Meeker. Back: *Kakagon Slough*, Ted Cline; *Huron River Watershed Council Member*; *Person on Dock*, University of Wisconsin-Extension; *Blue Winged Teal*, Mark Wallner; *Brule River*, The Nature Conservancy

Introduction

This guide is for all individuals who play a key role in any watershed; this includes you! All people live within watersheds and play an important part in protecting the health of their water. A **watershed** isn't limited to political boundaries like a township, county or state. Instead, it is simply **an area of land that drains to a common point**. Imagine a mountain. Rain and melting snow travel down its slopes in streams and through groundwater, transporting nutrients and sediments to the valleys below. The water resources of that area will remain healthy if the land on the mountainsides and in the valleys is properly managed. Keeping our watersheds healthy allows fish to continue to spawn and swim in the streams, trees to grow strong, wildlife to live in the forests, humans to have safe drinking water, and communities to flourish. Even though we often manage land according to county or township boundaries, it makes more sense to **plan and manage areas by the lay of the land -- its watershed**. Planning done with a watershed perspective brings together biological and social processes, preparing everyone to deal with management in a more holistic manner. Private landowners are as important to the health of a watershed as local, state, federal and tribal governments. Cooperation between landowners and municipalities is the only way to ensure that our water resources will remain strong and healthy.

Although the Chequamegon Bay area in Northern Wisconsin is used as an example throughout this guide, the information can be applied to many forested watersheds in Wisconsin and the Upper Midwest. In the early 90's, regions within the **Chequamegon Bay** area were identified by scientists from The Nature Conservancy and other conservation organizations as one of 200 "**Last Great Places**" (important areas for biological diversity) remaining in the United States. The Conservancy is working together with local communities to help keep this area in its current clean and healthy condition. This guide is intended to provide information to local citizens and encourage them to protect the clean water conditions that exist today so that **future generations** of children and grandchildren will have the same chance to drink clean water, fish quality streams and lakes, and live and work in an area that we currently enjoy.



Mark Walner

Blue Winged Teal



Jim Meeker

Canoeist Along Bad River



Ted Cline

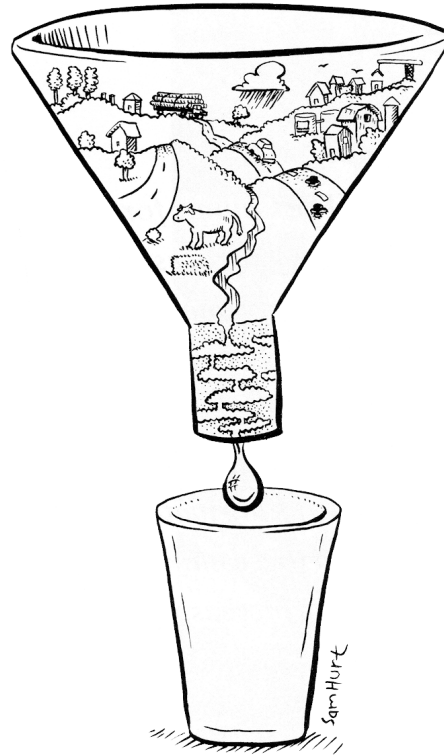
Kakagon Slough

Watershed Processes and Functions

*“Water is the most critical resource issue of our lifetime and our children’s lifetime.
The health of our waters is the principal measure of how we live on the land.”*

Luna Leopold

A useful analogy to describe the concept of a watershed is to think of it as a large **funnel** that directs water to one location. In the case of the Chequamegon Bay area, water is routed to Lake Superior. Watersheds perform other functions as well, including the transport of sediment, energy, organisms and pollutants. During the journey of these materials to Lake Superior, or any given end point, there may be periods of storage within the watershed. The water may be stored as groundwater, as part of a plant or as surface water, such as in a lake or wetland. These layovers can significantly lengthen the amount of time a drop of water can take to get from where it originally encountered the earth to its destination. This delay is also true for passengers on the journey: clay particles, microorganisms, nutrients and pollutants. If the upper portion of a watershed has nitrogen-rich soils, the nitrogen will be transported and delayed right along with the water. The same is true of pollutants. If the upper watershed is contaminated by nutrients and pesticides from homes and gardens, road and culvert erosion and sedimentation, runoff from farms, incompatible forestry, failing sewer systems or industrial discharges, the lower watershed will also experience the effects.



A watershed funnels water from a large area of land to one location and its boundaries are drawn by the shape of the land.



Cattails

Jim Meeker

Wetlands and Watersheds

When a plant or animal dies and begins to decay, its nutrients may fertilize nearby plants or be transported by rain and snowmelt to a different area in the watershed, such as a stream or wetland. Wetlands are like giant **natural sponges**, soaking up vast quantities of water in times of excess, then gradually releasing it as the land nearby is able to absorb it. Wetlands also act as a natural **filtration system**. Cattails and sedges are capable of absorbing large amounts of nitrogen, phosphorus, heavy metals and other pollutants found in the water. For example, an acre of cattail marsh can hold three times as many nutrients as an acre of grassland or forest! Since water is held longer in a wetland, it moves more slowly through the system than it would in a stream or river. As water slows down, it cannot hold sediments as easily and, since the nutrients or pollutants in the sediment are no longer suspended in the water, they drop to the bottom of the wetland where they are temporarily held in the soil and peat. The cleaner water flows from the wetland into streams and creates a healthier habitat for spawning trout and lake sturgeon, as well as other fish and animals.

Water Movement

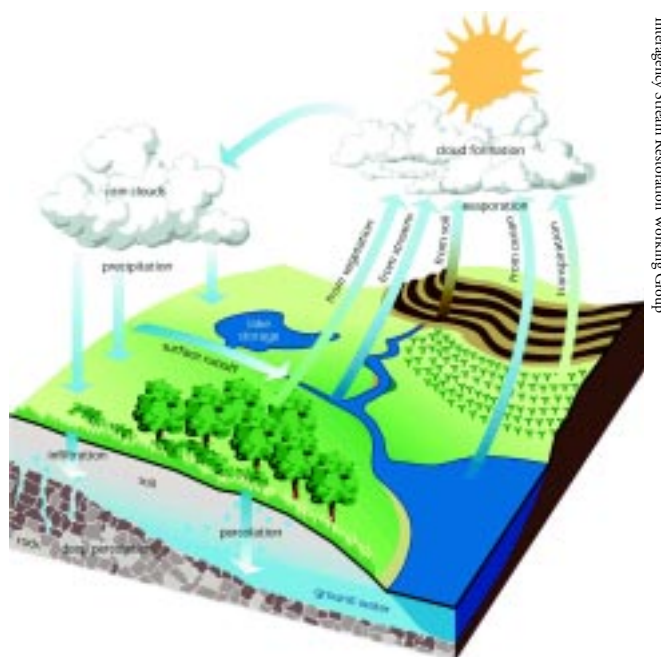
The rate and path by which water moves through a watershed are also dependent on the natural features of the landscape. What types of animals and plants inhabit the region? Are the soils sandy or do they contain clay? Is the watershed covered mostly with forests or does it contain more meadows and wetlands? The flow of water through a watershed is affected by all of these factors.

Sediments are moved in watersheds through the processes of erosion and deposition. As the water flows through the watershed, it washes away (erodes) some of the soil, clay or sand found on the stream banks. The **water carries these sediments** for a varying amount of time and then releases (deposits) the particles, often at the bend of a river or along a shoreline at the river mouth. Soil eroding and being deposited in a different location is part of the natural process. But, **when land uses change**, disrupt, accelerate or halt the natural processes, **long-term damage** to the watershed **results**. Soil particles can fill in deeper holes where fish find refuge, or cover gravel and fish spawning beds. Streams can be unnaturally forced to change their course, becoming more channelized and less winding. Such changes in stream course affect habitat for all the organisms in the stream and increase the water flow rate. This disrupts the stream's ecosystem and causes more damage to the banks downstream.



Mark Dallman, The Nature Conservancy

Sediments naturally travel through a watershed, but some land uses change this natural process causing long-term damage to our resources. Slumping riverbanks, caused by improper logging practices on fragile soils, increase sediments in the water covering fish spawning beds.



Interagency Stream Restoration Working Group

Water Cycle. The transfer of water from precipitation to surface water and groundwater, to storage and runoff, and eventually back to the atmosphere is an ongoing cycle.

Forests

Water tends to move slowly through forested areas. Rain falling in a forest first splashes on the leaves of the tallest trees. The rain drips from the leaves, falling on more leaves, branches, bird nests, lichens and bark until some of it hits the forest floor. Once on the ground, the water must flow over vegetation, woody debris and leaf litter before it eventually seeps into the soil where it slowly permeates the ground and is soaked up by plant and tree roots.

When heavy rains occur, excess water may be stored as groundwater, held in temporary ponds or travel to a nearby depression that leads to a stream or river. The water held in the temporary ponds is very important for the reproduction of many amphibians such as salamanders and frogs. The rain not only nourishes the plants and animals of the forest and adds to the water in the river, but much of the rain re-enters the water cycle as it evaporates from the leaves and branches of the trees. In winter, evergreen trees hold snow and shade the forest, allowing the snow to melt more slowly. This helps to reduce the impact of a sudden snowmelt.

Land Changes

Changes on land affect the flow of water within a watershed. These changes may occur naturally or as a result of actions by humans and other species. Many different habitats experience gradual processes of change: young forests grow into mature forests, dry areas may become wetlands, and wetlands can become wet forests.

Imagine, for example, an abandoned field. It gradually becomes overgrown with grass and brush. Wind, birds and other wildlife carry seeds to the field. Over time, trees may grow and the field becomes a young forest. As these trees grow older, younger trees grow beneath them. Eventually, over many years, the forest becomes mature.

Compared to a forest, **fields** contain minimal vegetation to catch rain or snow as it falls. Water in fields tends to move quickly to nearby ditches or streams. When moving with greater speed and force, runoff water picks up more sediment, hastening the process of erosion. Heavy rainfalls in agricultural areas tend to be more “flashy,” meaning **floods tend to occur more frequently and with more intensity** than in areas covered with trees, downed logs and vegetation.



The Nature Conservancy

The development of an urban area takes place gradually over many years and is not always as noticeable as a clear cut.



Matt Dallman, The Nature Conservancy

Spring floods wash over roads and can carry automobile waste (oil, antifreeze, salt, etc.) into adjacent waterways.



Terra Tech, Inc.

Floods tend to occur more frequently and with more intensity in open areas than in areas covered with trees, downed logs and vegetation.

People and Pavement

In addition to natural changes, watersheds are also subject to alterations made by humans. Human changes include filling wetlands, deforesting riverside areas for agricultural, residential or commercial development, and channeling water into ditches from roadways and farmlands. The most extreme modifications involve changing the course of a river or building a dam that entirely stops the water flow. A less obvious way in which people alter watersheds is by creating cities or towns from farmland and creating farmland from forests. The change of wilderness to urban areas is not always noticeable because it takes place gradually over many years. When an area is developed, roads and houses are built. Sidewalks, driveways and parking lots begin to appear as well. Rain cannot penetrate these surfaces. Instead, the water flows downhill until reaching an exit, such as a storm sewer, ditch, creek, or, in rare instances, a retention pond. It may not seem like much, but the water that is prevented from slowly percolating into the ground has a drastic effect when it ultimately finds a pathway. Ditches overflow, streams flood, and storm sewers back up. The water picks up and carries with it anything found on these surfaces — oil, antifreeze, road salt, lawn fertilizers and pesticides, litter, dog feces — then deposits these contaminants into bodies of water we use for drinking, fishing, swimming and playing. To a varying extent, all **human activities impact a watershed.**

Streamside Vegetation

A **buffer** is an area of trees, shrubs and vegetation located adjacent to rivers, streams, lakes, ponds and wetlands. Buffers **filter out sediment and nutrients from runoff**. As the water reaches vegetation (roots and leaves on the forest floor) it slows, allowing time for the vegetation to absorb nutrients like nitrogen and phosphorus and trap sediments, keeping them out of waterways. Woody vegetation in buffer areas provides food and cover for wildlife and helps lower water temperatures by providing shade and slowing floodwaters. The roots of streamside trees, shrubs and grasses also protect and strengthen stream banks. Downed branches and logs in buffer areas deflect water runoff, and play an important role as home for insects, amphibians and small mammals.



Interagency Stream Restoration Working Group

Streamside forest cover serves many important functions such as stabilizing stream banks and slowing water runoff.

Buffer Benefits

- Food and cover for a variety of wildlife
- Nesting and resting sites
- Feeding perches for birds of prey
- Crucial travel corridor for mammals and birds
- Stabilizes river banks and lakeshores
- Protects water quality
- Slows down water run-off
- Filters excess nutrients and sediments
- Aesthetically pleasing

Streamside forests serve as a source of woody debris for rivers. Logs, tree branches and snags that have fallen in the river slow the flow of water and trap finer materials, such as leaves and grasses. In addition to stabilizing the river bottom and creating a habitat for animals living there, this woody material provides food for a variety of the small aquatic organisms that fish feed on. In some developed, urban and agricultural areas, streamside vegetation is the best remaining habitat, food source and breeding area for wildlife. Streamside forests can also serve as safe travel corridors for animals and migrating birds.



North American Benthological Society

Caddisfly larvae

Little Decisions Make Big Impacts

When the logger saw the landowner's little stream, he treated it with care. When he could not find a way around the stream, he installed a temporary rock or corduroy log crossing to allow his heavy truck to pass over without causing erosion. He left plenty of trees adjacent to the water to stabilize the banks and provide shade so the water would not get too warm in summer. And, after the trees were selectively harvested and the machines had left, the logger seeded the roads he'd made with native grasses to prevent future erosion. Some might contend that since the creek was so little and so local, any extra dirt and slash in the water, or the felling of nearby trees that shaded it, wouldn't have hurt anything. Try telling that to the caddisflies and stoneflies

that hatch every spring in cold, clear, tiny streams. Waters like these are nurseries for baby fish until they are big enough to swim downstream, where both two and four-legged predators eagerly await them. If the water is warmed, clouded by sediment washed off an exposed bank and depleted of oxygen, the flies and the little fish can die. With creeks both large and small crisscrossing every square mile of Wisconsin forestland, it's little **daily decisions like these that keep our waters gleaming** and prevent a community from wondering where all the good fish went.

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Chequamegon Bay Area Watershed

In 1659, two French explorers, Radisson and Groseilliers, paddled thousands of miles to start their new lives in the New World and eventually ended their journey at the Chequamegon Bay. They stayed because of the animals and fish and ducks, the clear waters and the fine picnic sites, and also because the northern lights look best seen across the big lake.

The French explorers took notice of the **clear waters** that were fed by a large watershed. What they may not have realized is that the forests, wetlands and swamps located miles away from the Bay helped to keep the waters of Chequamegon Bay healthy. Nearly 350 years have passed and Chequamegon Bay still attracts people from all over the world. The Northern Great Lakes Visitor Center located near Ashland has hosted visitors from 34 different countries including Brazil, England, Israel, Japan, New Zealand and Norway. The Ashland Chamber of Commerce estimates that more than 500,000

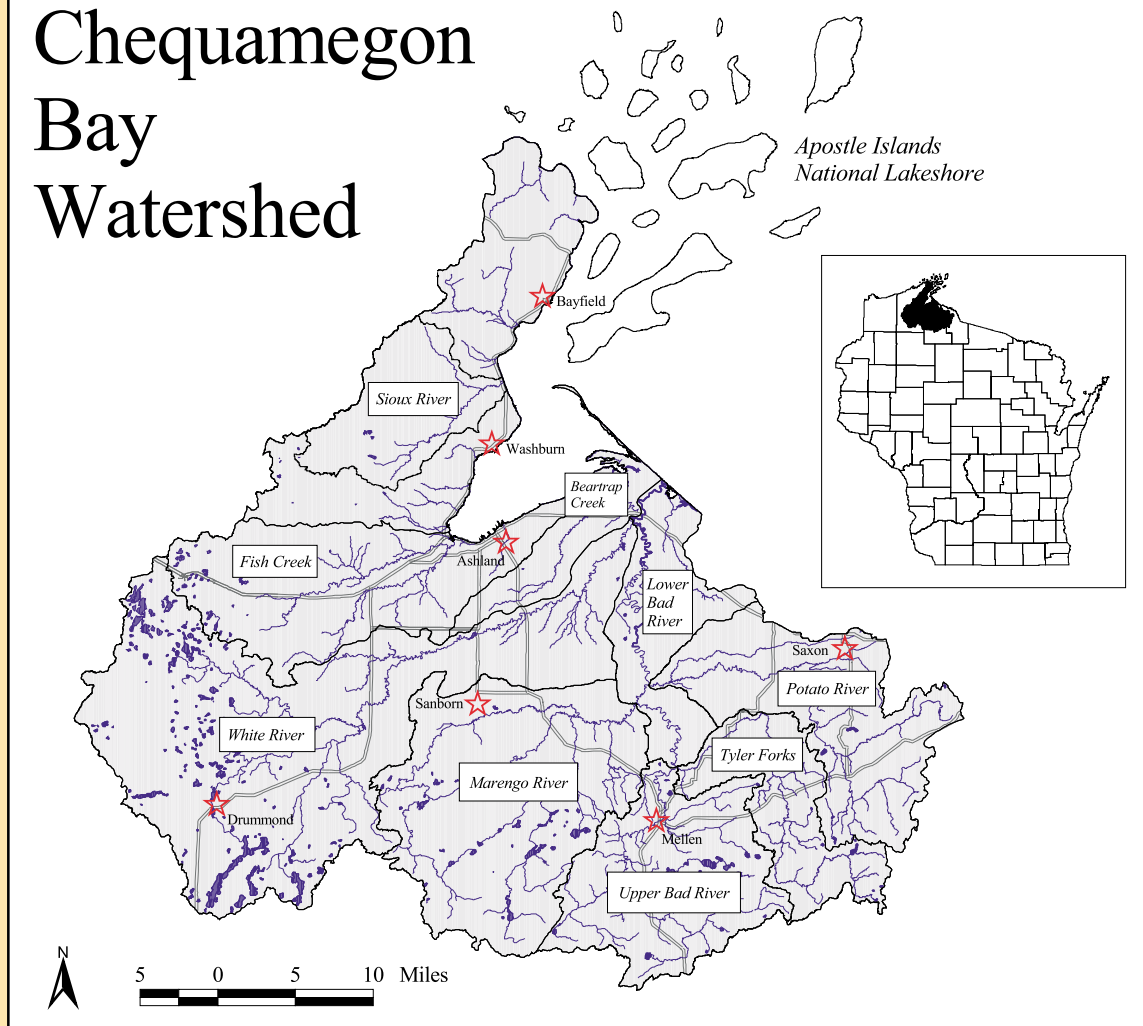


Northern Wisconsin Heritage Connection

People paddled thousands of miles to reach Chequamegon Bay and began to start new lives as re-enacted in this photo.

people visit the Chequamegon Bay region each year. Although the area continues to attract people, the land has undergone many changes since Radisson and Groseilliers first arrived.

Chequamegon Bay Watershed



The Nature Conservancy



Ashland Historical Society

Chequamegon Bay, located on the south shore of Lake Superior, is bordered by the Bayfield Peninsula to the northwest. Long Island and Chequamegon Point nearly seal the entrance to Lake Superior to the northeast. Nestled at the tip of the Bayfield Peninsula, the 22 Apostle Islands sit just outside of the Chequamegon Bay. Ojibwa legend says that Winnebougou, an Ojibwa spirit, threw great handfuls of sand from the dam that created Chequamegon Bay (Long Island/Chequamegon Point) at an escaping beaver and, in the process, formed the Apostle Islands and the opening to Chequamegon Bay.

The Chequamegon Bay Area Watershed is a compilation of multiple watersheds that all flow towards Lake Superior, and includes land in Ashland, Bayfield and Iron counties. This area is now inhabited by more than 38,000 people (2000 U.S. Census). Since the time of Radisson and Groseilliers, forests have been cut and burned, and continue to be intensively managed. Farm fields are now scattered throughout the area. Towns and cities have been built, and more than 2,600 miles of roads (not including logging, recreation and fire roads) exist within the watershed. If done in a manner that is compatible with natural systems, road building, development and logging aren't necessarily detrimental activities. But they can still have a significant impact on how quickly the water flows

into the Bay and how much sediment and other materials the water running off these areas picks up along the way. The forests in the Penokee Range, the Bibon Swamp and the streams and rivers flowing through farmlands, all work together to cycle nutrients, filter contaminants, absorb and slowly release water -- sustaining wildlife, fish and people.

The **watershed** that feeds **Chequamegon Bay** includes nearly **one million acres**, more than any other single watershed on the southern shore of Lake Superior. In perspective though, it is only 3% of the entire watershed for Lake Superior, which covers more than 31.5 million acres.

Lake Superior Facts

- Size – 31,700 square miles
- Deepest spot – 1,332 feet
- Watershed area – 49,300 square miles or more than 31.5 million acres
- Volume – 3,000,000,000,000 (3 quadrillion) gallons
- Average outflow of water – 75,000 cubic feet per second through the Sault Ste. Marie locks
- Average number of vessels that visit the Duluth/Superior port per year – 1,000
- Length of time water stays in the lake based on volume and rate of outflow – 191 years
- Total number of fish species in Lake Superior – 78

Chequamegon Bay Facts

- Size – 53 square miles
- Deepest spot – 67 feet
- Average depth – 28 feet
- Watershed area – 1,440 square miles (921,561 acres)
- Total number of fish species in Chequamegon Bay – 57



Sonya Newenhouse

History of People

Before Columbus arrived in the New World, the **Anishinabe**, or Ojibwa, people came to the land they called Szah-guh-wah-mih-koong, which has several interpretations including a “region of shallow water with extended breakers.”

The Anishinabe discovered abundant wild rice in the area more than 600 years ago. The **Kakagon/Bad River Sloughs**, within the Chequamegon Bay watershed, are currently the only remaining location where wild rice can be found in abundance on Lake Superior. The Sloughs produce nearly 20,000 pounds of rice annually. The traditional ricing methods use a technique that allows some of the rice to remain and fall into the waters to naturally provide seed for future years of wild rice.



Matt Bradley

The Kakagon and Bad River Sloughs produce nearly 20,000 pounds of wild rice each year.



Jim Mecker

Anishinabe, or Ojibwa, child demonstrates traditional cultural dance.

People and Place

- Eight different Indian nations have lived on the Bay.
- Four flags have flown over the area:
Spanish, French, English and American.
- The Chequamegon Bay area was part of the original Northwest Territory.
- Settlers included:
 - European explorers
 - Missionaries
 - Fur traders
 - Immigrants who platted and developed the lands
 - Railroad workers
 - Miners
 - Shippers
 - Loggers
 - Farmers



Ashland Historical Society

Asaph Whittlesey was the area's representative to the State Legislature in the 1870s. To protest the fact that railroads did not reach his representative lands of the Apostle Islands region, he snowshoed 250 miles to Sparta, the closest railroad connection at the time.

The two **French explorers**, Radisson and Groseilliers, were the first Europeans on record to visit Chequamegon Bay, arriving in 1659. In 1854, Asaph Whittlesey, the namesake of a local creek, set out to explore the Chequamegon Bay area. This marked the beginning of many people traveling to Chequamegon Bay to create a new life in a new land. These people spotted something unique about the Chequamegon Bay area.



Ashland Historical Society



People settling in the Chequamegon Bay Region were optimists, opportunists and people of stubborn courage who braved harsh winters and difficult conditions to build a better life.

Employment

Today, the **livelihood** of many people who live in the watershed is still **strongly tied to the land and waters**. Wisconsin's wood products industry is the second largest manufacturing sector in the state, employing 96,000 workers. Loggers, wood mill employees, restaurateurs, gift shop owners, hotel operators, resource professionals, bough and wreath makers, commercial fishermen, meat market workers, land appraisers, land realtors and road construction workers are all connected to the natural resources of the watershed. All of these workers need schools, hospitals and clinics, grocery stores, gas stations and retail stores — and all these entities employ more individuals. Everyone in the area, from citizens to manufacturing companies, **depends on clean water** coming into their homes and workplaces.



Wisconsin Department of Natural Resources

Today, people are still relying on the land and water resources to make a living, as shown above in this photo of a herring catch.

Recreation

The land and water are important for employment and also for **personal enjoyment** by locals and visitors. Ask people why they live here or visit, and they will list the clean environment, beautiful landscape, diverse natural resources and outdoor recreational opportunities. It's the outdoors that makes Wisconsin a great place to live.



Robert Kleppin

Caroline Lake sunrise

- While 50% of Wisconsin adults participate in fish and wildlife-related recreation, 80% of Chequamegon Bay area residents enjoy these activities.
- Fishing in the Great Lakes generates \$200 million for local economies.



North American Benthological Society

- Wisconsin sells more non-resident fishing licenses than all other states except Florida.
- An estimated 400,000 people come to Wisconsin each year to watch wildlife.



Steve Richter, The Nature Conservancy

- Fishing, hunting and wildlife-watching activities generate \$8 billion of economic output in Wisconsin, nearly half as much as the dairy industry.



Sonya Newhouse

- Opportunities to collect berries, mushrooms, princess pine, maple syrup, boughs, pine cones and medicinal plants, have increased to the point where natural resource managers are monitoring populations and looking at harvesting plans to protect these resources on public lands.

- Many recreational trails are located throughout the watershed, including the North Country Trail and a large trail network through the Chequamegon-Nicolet National Forest providing both motorized and non-motorized uses.



Wisconsin Department of Natural Resources



Wisconsin Department of Natural Resources

Aerial view of Apostle Islands

- The Apostle Islands National Lakeshore offers a variety of recreational opportunities. The National Park Service provides more than 50 miles of maintained trails, camping on 17 islands, and tours of the historic lighthouses.

Natural Resources

Chequamegon Bay is fed by more than **2,100 miles of rivers** and tributaries and covers nearly one million acres of land. These waterways meander through Ashland, Bayfield and Iron counties, traveling from the Penokee Range through many small rural communities and eventually flowing into Chequamegon Bay. The watershed consists of several very different natural communities including forests, dunes, sloughs and large river complexes. These communities contain unique features that are not found elsewhere in the Great Lakes Region.

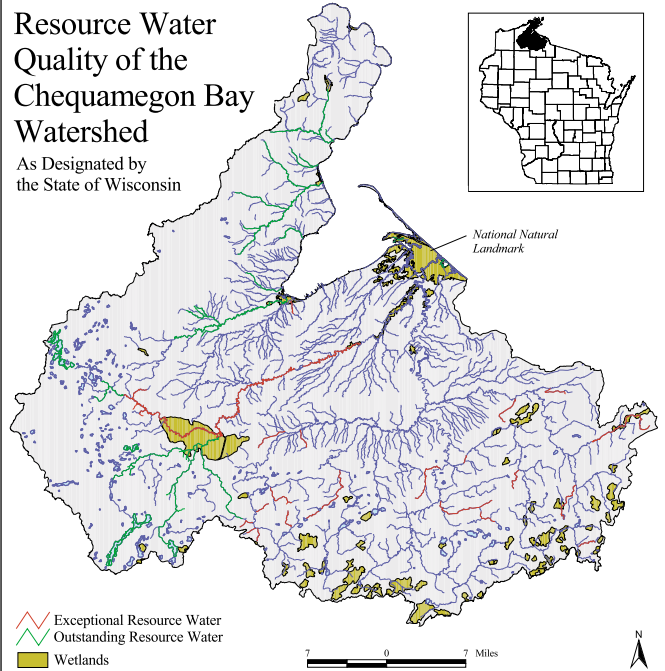


Long Island

Gerald H. Emmerich, Jr.

Resource Water Quality of the Chequamegon Bay Watershed

As Designated by
the State of Wisconsin



The Nature Conservancy

Natural Treasures of the Chequamegon Bay Watershed

- The U.S. Department of the Interior has designated the Kakagon Sloughs, home to many threatened and endangered species such as the trumpeter swan, yellow rail, bald eagle and wood turtle, as a National Natural Landmark.
- This area hosts more than 2,100 miles of streams, 11,000 acres of lakes and flowages, and nearly 40,000 acres of wetlands.
- The Chequamegon Bay area harbors 137 plants and animals and 33 natural communities of special concern.
- The Bayfield Peninsula serves as an important migratory stopover site for birds of prey and songbirds on their journey across Lake Superior.
- The U.S. Fish and Wildlife Service has designated habitat in this area as critical habitat for the federally endangered piping plover.
- The forests within the watershed are very important for breeding populations of neo-tropical migrant song birds, such as the black-throated blue warbler, as well as many mammals, including black bear, bobcat, fisher, marten and wolves.
- The rivers and wetlands provide important spawning habitat for lake sturgeon and many game fish that, in turn, provide a source of food to local citizens and support the local economy and fishing industry.
- In addition to the natural values of this area, the Chequamegon Bay watershed also provides the drinking water supply for the municipalities of Ashland, Bayfield, Mellen and Washburn.



Bobcat

Scott Mulcahy

Threats to the Watershed

*"We abuse land because we see it as a commodity belonging to us.
When we begin to see land as a community to which we belong, we may begin to use it with love and respect."
Aldo Leopold*

The size of Chequamegon Bay makes it hard to imagine that anything could impact its health. In reality, however, some land uses within the watershed are having detrimental long-term impacts on the Chequamegon Bay area.



Jim Meeker

Erosion occurring as water running off the land carries particles of clay that color the waters of the Bad River, Honest John Lake and Lake Superior.

Erosion

Unplanned forest management, runoff from agricultural fields, development and road building have an impact on the quality of water, which is vital to the health of the area. Runoff from these activities gives Chequamegon Bay a prominent cloudy red appearance during spring-melt and after heavy rains.

The types of soils found in this region tend to exacerbate the situation. In portions of the area, the glaciers deposited a considerable amount of clay mixed with sand. The combination of clay and sand, along with drought and rain events, causes these soils to erode more easily than other soil types. Areas with these clay/sand soils are particularly sensitive to disturbance; improper land uses can cause the banks to slump and erode into our waters.

Heavy sedimentation caused by erosion covers important fish spawning grounds and interferes with the ability of aquatic organisms to live successfully. This disrupts the lower level of the food chain, which includes small aquatic insects, and will eventually affect species that live at the higher end of the food chain including mink, otter and humans.

Erosion and Drinking Water

The Ashland Water Utility issued a warning May 1, 2001, instructing city residents to boil their water. Heavy rains had moved red clay into Chequamegon Bay, the source of Ashland's drinking water. The high turbidity exceeded state and federal drinking water standards, which automatically triggered the warning. The turbidity itself caused no ill health effects, although it caused taste and odor problems. Nevertheless, more particles in the water can interfere with disinfection and provide a medium for bacterial growth. Ashland residents lined up for drinking water at nearby artesian wells as an alternative to turbid city tap water.

"City water is discolored and may have an objectionable odor due to a heavy sediment load in Chequamegon Bay caused by runoff during recent heavy rain storms."

*Ashland Daily Press
May 1, 2001*

Buying our Water

In Chequamegon Bay, an area rich in natural water resources:



Sonya Newenhouse

- More than 40,000 gallons of bottled drinking water were delivered to area homes and businesses in 2001.
- 11,000 cases of bottled water were distributed to area stores in 2001.
- 600 water filters were installed in the past five years by one business alone.

Forest Fragmentation

Forests cover nearly 50% of Wisconsin. The majority of these are located in the northern portion of the state. They are the reason that this part of the state is known affectionately as the “northwoods.” These forests contribute to biological diversity; provide resources for the pulp, paper and lumber industries; and provide places for recreational activities including hunting, fishing, hiking, bird watching and photography. They enhance air quality, benefit waterways and provide wildlife habitat. And they represent refuge to many of us — a place to get away from it all.

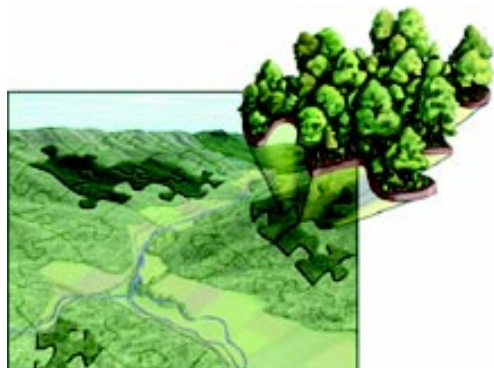


Mark Dallman, The Nature Conservancy

Forests enhance air quality, benefit waterways and provide wildlife habitat, in addition to providing pulp and lumber resources.

Wisconsin's forests provide both livelihood and leisure to residents and visitors. However, fragmentation, suburban sprawl and increasing road access are threatening the forests of the Chequamegon Bay region. Forested land in Wisconsin's north country is being parceled and sold in smaller and smaller lots. As a result, much of what has come to define the northwoods — solitude, quiet lakes and abundant wildlife — is disappearing.

Fragmentation means *the steady trend toward dividing land into ever smaller acreage parcels*. This trend was first seen on the inland lakes of Wisconsin in the 1940s. When large forest tracts are divided into smaller ones, it is rare that the various new landowners will have the



Landowners working together with their neighbors to manage the larger forest rather than each piece will lower their costs and maximize the benefits of management.

Fragmentation Concerns

- Local governments find themselves facing serious planning challenges and increasing infrastructure costs in an effort to respond to the service demands of dispersed development.
- Forest-product based economies are seriously influenced by higher removal costs due to economy of scale and increasing conflicts among landowners regarding goals for forest use.
- Recreational forest users are impacted by decreased access to private lands.
- Conflicts arise between new and traditional recreation uses and lost opportunities for solitude.
- Species such as forest raptors and songbirds that depend on continuous forest cover, as well as air and water quality, are threatened by fragmentation and forest conversion.
- 82% of Wisconsin timber harvests come from private lands, often without management plans.

same forest management goals as each other, decreasing the chances for management and protection of these forest tracts. This trend is occurring at an increasing pace as large tracts of forest in northern Wisconsin, previously owned by paper companies, are being divided into small parcels and sold to new landowners. While new landowners may have good intentions to responsibly manage their own land, the likelihood of all the landowners in an area working together on management strategies is not great.



University of Wisconsin Extension

Forested land is being parceled and sold in smaller and smaller lots. Much of what has come to define the northwoods -- solitude, quiet lakes and abundant wildlife -- is disappearing.

However, if the **landowners work together** and agree on **similar management goals** for their combined lands, they could **lower the costs** of management and harvests while **maximizing the benefits** to the forest. Landowners can work together to form associations or cooperatives (see Forest Cooperatives in Resource Section for more information).

Non-Native, Invasive Plants and Animals

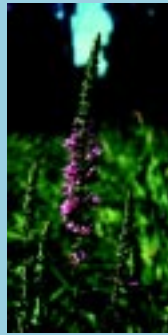


Miles Falk, Great Lakes Indian Fish and Wildlife Commission

Purple Loosestrife at Port Superior

Invasive weeds cost agencies and private citizens billions of dollars in North America every year. The costs of lost productivity, herbicides, labor and research efforts mount as these plants degrade fish and wildlife habitat, clog waterways, turn pastures into wastelands, compete with agricultural crops, disrupt forest regeneration and overrun natural habitats.

- In the United States, invasive weeds cause an overall reduction of 12% in crop yields, costing \$24 billion in crop losses and \$3 billion for control, totaling \$27 billion dollars every year!
- Purple loosestrife alone costs \$45 million per year in control costs and losses.



Miles Falk, Great Lakes Indian Fish and Wildlife Commission

Purple Loosestrife

Invasive species represent another significant threat to the region. They are **unwanted plants and animals that aggressively dominate and displace native plants and animals**. They disrupt ecosystems and affect citizens' livelihoods and quality of life. They hamper boating, swimming, fishing and other water recreation, and they take an economic toll on commercial, agricultural and aquatic resources. Purple loosestrife, zebra mussels, Eurasian watermilfoil, sea lamprey, Eurasian ruffe, spiny water flea, gypsy moths, multi-colored Asian lady beetles, garlic mustard and common buckthorn are biological bullies. These and hundreds of other plants, animals and pests from other regions and continents are invading Wisconsin lakes, rivers, forests, wetlands and grasslands.

Some were purposely brought here, like the gypsy moth, in an attempt to develop a hardy silkworm. Others came here by accident, like zebra mussels, which entered the Great Lakes in the ballast water of foreign ships and spread to Wisconsin's inland waters via unwitting recreational boaters. New invasive species keep arriving.

Controlling these species has been difficult due to limited resources and because invasive species are not kept in check by the predators, parasites, pathogens and competitors they would face in their homelands. The **best tactics** in fighting these invaders **are education and prevention**. More information about invasive species can be found in the Resource Section.

Sensitive Sites

Some areas within Chequamegon Bay are especially sensitive to human uses. Examples include Chequamegon Point and Long Island, which were both formed by sand being deposited from Lake Superior. Human activities such as riding ATVs along these dune systems and letting dogs run free can significantly impair the nesting ability of the piping plover, an endangered bird species in Wisconsin. Piping plovers historically used this area for nesting, however by 1981, they were forced to find a safer location for hatching their young. In 1997, they returned to the area and began nesting successfully once more. In four of the past five years, **piping plovers** have hatched and raised young. Their **success** is **due** primarily to **people's increased awareness** of the importance of these dunes as sensitive nesting areas.



The Nature Conservancy (both photos)

Piping plovers have returned to nest on Long Island and Chequamegon Point. These endangered birds have been threatened by ATVs and free running dogs on their beach nesting sites.

Development

The last glaciation left **15,057 lakes** in Wisconsin, more than 12,400 of which are found in northern Wisconsin. Pressure to develop these lakes has been dramatically increasing. Between 1965 and 1995, approximately **two-thirds of northern Wisconsin's** pristine **lakes** were **developed**. Protecting lakeshores and their surroundings is important not only for the plants, animals and natural communities found there, but also to avoid the impact that development can have on water quality.

Unplanned development is a great threat to a watershed's health. Watersheds collect water and direct it to the pool from which we drink, swim and fish. Some **concerns** about changing the land uses from forested to rural and ultimately suburban include the following:

- Toxic doses of pesticides and fertilizers used on lawns and farm fields that contaminate water.
- Automotive fluids are flushed from pavement.
- Aging septic systems add too many nutrients to the water.



Road Washout

Morgan Hannaford

- Improper culvert installation results in increased sediments flowing into our trout streams.



Impacts from Urban Development

Tetra Tech, Inc.

- Hard, impervious surfaces from new home and road construction funnel pesticides, road salt, oil, antifreeze, dog feces, litter and everything else the water will carry to our street drains. These will then contaminate bodies of water we use for drinking, fishing and swimming.



Two-thirds of northern Wisconsin's pristine lakes were developed between 1965 - 1995.

University of Wisconsin-Extension



Landscaping with Loosestrife

E. Sutton, Great Lakes Indian Fish and Wildlife Commission

- Landscaping with non-native, invasive plant species will spread these plants to natural areas where they quickly dominate the native species and change food sources for insects, birds and mammals.
- Water flowing off cleared hills carries tons of sediment.



Pasture Runoff

North American Benthological Society

- Rain falling onto farmyards and feedlots washes excess nutrients and pathogen-loaded animal waste into streams.

Land use planning is necessary in watershed management. Often, the policies and programs dealing with the way we utilize our lands are narrowly focused or conflicting. They can impede broader solutions that would benefit everyone. A holistic approach to watershed management is needed, one to:

- Recognize that most of the resources in a watershed are dependent on each other, and
- Link human activities with environmental degradation of those sources.

Contamination

Contamination of our resources is not a new concern. Years ago sawmills dumped piles of dust into Chequamegon Bay, covering up the natural spawning habitat for fish. Waste products



from taconite mines flowed into the water. Even today, everything from refrigerators to artificial Christmas trees are dumped in rural areas where roads cross ravines, ditches or small streams.

Communities are dealing with the effects of these past and present practices and are working together to make sure they don't continue to occur.

Fish Consumption Advisories

Fish consumption advisories warn the public that high concentrations of chemical contaminants have been found or are suspected in fish from local waters and that consumption of these fish may pose health risks. The advisories may recommend limiting or avoiding consumption of specific fish species or fish from specific waterbodies.

The Environmental Protection Agency found a substantial **increase in lake acreage and number of river miles** in the nation **now under fish consumption advisories**. Wisconsin has the second highest number of warnings with 469. Minnesota, with 941, has the highest number of warnings. These numbers are drastically higher than 198 advisories in Indiana, which has the third largest number of fish advisories in the United States.

The major pollutants targeted in these advisories are mercury and polychlorinated biphenyls (**PCBs**). PCBs are human-made substances that were used in the manufacture of electrical transformers, carbonless papers, cutting oils and hydraulic fluids. PCBs were banned in 1976 and, although levels have dropped, they are still found in the environment, mainly in the Great Lakes, their tributaries and the Mississippi River.

Approximately 80% or more of the **mercury** deposited in Lake Superior has come from the atmosphere. Burning fossil fuels (mainly coal) releases mercury, which is transported in air currents and deposited, through

rain and snow, in surface waters. A national and international effort is needed in order to appropriately deal with mercury and other critical pollutants and their effects on 'edible' fish and 'drinkable' water.



Sonja Newenhouse

Fish Advisories

It is important to understand that, while a single advisory has one geographic location (e.g. a piece of a river or lake), it can contain information about several fish species, several pollutants and several "populations" of people (e.g. no consumption for at risk subpopulations such as pregnant women and restricted consumption for general populations).

DNT in Wells

A contaminated site that flows into Chequamegon Bay is the DuPont property, located south of Washburn in the Town of Barksdale. The E.I. Du Pont de Nemours & Company operated at this location from 1904 to 1971. During WWI, the DuPont plant was the world's largest producer of dynamite (**TNT**). Some byproducts of that manufacture, called dinitrotoluenes, or **DNT**, have found their way into some nearby property owners' **drinking water wells**. So far, DNT has been found in 17 of 75 wells tested.

While the levels of pollutants are low where they've been detected, most still exceed state water quality standards. DuPont also plans to test some areas for PCBs because electrical transformers, which contain PCBs, may have been dumped on the site. Since the groundwater flows eastward toward the lake from the property, anybody living a few miles to the north, south or west should not have problems with their drinking water. But, this also means that these pollutants are making their way to the Chequamegon Bay where their ultimate effects on the fish, plants and aquatic life are not yet known.

Ashland Lakeshore

A portion of the Ashland lakeshore has been contaminated to the point where it has received national attention, gaining the highest level of priority designation for clean-up. According to the Wisconsin Department of Natural Resources, the contamination is derived from a former manufactured gas plant that occupied Xcel Energy's property from the late 1800s to the 1940s. Xcel has argued that at least some of the contamination may have come from a former wood treatment plant located on the lakeshore. There is an estimated **200,000 gallons of concentrated coal tar** below the ground.

These examples demonstrate how **long-term monitoring can identify** areas of potential **health risks**. Yearly testing of fish species and water quality in our state's lakes and rivers allows the public to be informed of the quality of fish they eat. Yearly tests of drinking water wells near the DuPont property from the 1970s through today detected the presence of DNT in the water and instigated the clean-up of the contaminated area. Many years went by before testing discovered the existence of the concentrated coal tar on the Ashland lakeshore. Long-term testing of our area waters provides early detection of potential problems and information that can be used to find solutions. These contaminated areas may not pose a high health risk at this time, but if monitoring did not detect the problems, clean-up would not be occurring. People would still be using these waters for drinking and recreation. Monitoring has decreased the long-term negative effects of these



Hudson River Watershed Council

Long-term testing of our waters can provide early detection of potential problems and information that can be used to find solutions.

pollutants on the natural system and the humans that live and use the area.

Local Watershed Councils are an effective way to ensure the monitoring of our waters. Composed of individuals who live, work or are concerned about protecting the land and water in the area, these councils are excellent watchdogs for waters and resources.



Ashland Historical Society

Kreher Park with Oredock in Background

Clean-Up Efforts

The primary focus of clean-up efforts is on contaminated sediments in the Bay, which is the most likely place people could be exposed to the pollutants. While the coal tar should not pose a significant threat to the people using the surrounding public boat launch, city park, swimming beach and Ashland Marina, people should obey the signs and not swim, wade, fish or boat in the marked areas.

Watershed Protection Efforts

*“Never doubt that a small group of committed citizens can change the world.
Indeed, it is the only thing that ever has.”*

Margaret Mead, Anthropologist

Watershed Councils

Councils provide an opportunity to bring together many groups and organizations on a common project, including environmental organizations, political groups, town and city boards, private landowners, industry, educational institutions, scouting troops, recreational clubs and many others. Watershed councils are started by, and include, **people like you** -- people who care about the health and quality of the watershed they live in. All it takes is a group of concerned, dedicated citizens.

The actions of a watershed council are up to its members. There may be a need to hold meetings to inform people of problems within the watershed. When problems exist, the council can evaluate the potential threats and determine the best possible ways to reduce them. The council may sponsor canoe trips or other recreational and social activities within the watershed. The group may decide to monitor the quality of their local streams and rivers, seek grants, represent their interests on land use planning committees, and meet with legislators for support on key issues. There are many possibilities.



Terra Tech, Inc.

Councils provide an opportunity to bring together many groups and organizations on a common project.

The importance of **watershed-based decision making** is becoming better understood than in the past. In recent years, many agencies and local governments have moved toward planning at the watershed level. There is a wealth of information available on how to start watershed councils. Contact one of the resources listed in the back of this publication for more information.



Huron River Watershed Council

Concerned, dedicated citizens work together to form Watershed Councils to ensure responsible decision making is occurring in their watershed.

To improve the quality of life for you and future generations, get involved in a watershed council or help to organize a council in your area if one does not already exist.



Huron River Watershed Council

Volunteering to protect the watershed.

Local Efforts

Local efforts are taking shape in the Chequamegon Bay area to protect two local watersheds, the Bad River and the Sioux River Watersheds.

A fledgling **Bad River Watershed Council** emerged in 2001 in order to address the issues of a watershed that encompasses nearly 700,000 acres and includes parts of three counties and a tribal reservation. The Ashland-Bayfield County League of Women Voters helped spearhead the effort to create a council for the Bad River Watershed with the collaboration of several



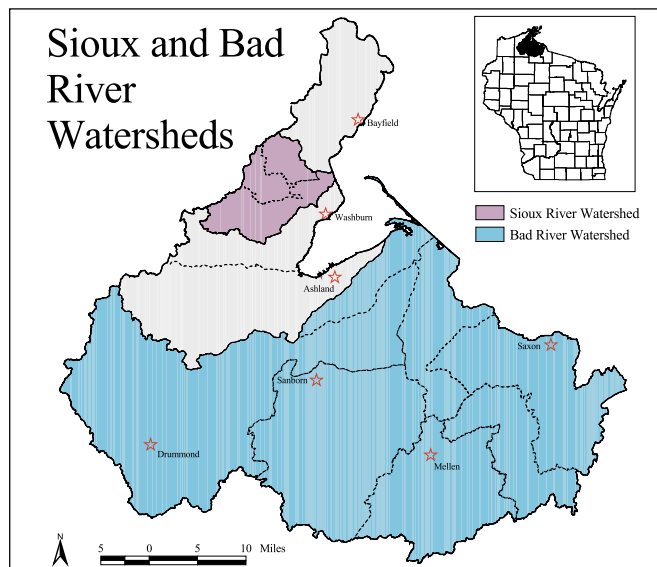
"People in the Bad River Watershed are becoming increasingly aware of the interconnection between human and natural communities. It is gratifying to be involved with a group that is striving to protect the health of natural resources for future generations."

*Joan Elias
Bad River Watershed Resident*

agencies, organizations and local citizens. The cooperating groups feel it is important to establish a watershed council for this large watershed in order to protect and enhance water quality for the benefit of people, fish and wildlife. The coalition hopes that as local citizens become more involved, they will discover how enriching it can be to participate in a group dedicated to protecting the surrounding area. Because watersheds cross political, ethnic and economic boundaries, it is important for everyone to begin thinking and planning according to watershed boundaries.

Another council, the **Sioux River Watershed Council**, began to organize in the mid-1990s and includes interested citizens living in the watershed and individuals who value the resources of the Sioux River. The mission of the Sioux River Watershed Council is to foster better stewardship of the Sioux River watershed, promote restoration, and ensure sustainable watershed health, functions and uses. Key issues identified by the Council include the need for integrated management, citizen monitoring, stream restoration and a better understanding of water/road interaction. The group proposes to begin a planning process for management of the coastal wetland formed at the confluence of the Sioux River with Lake Superior. The Council is looking

Sioux and Bad River Watersheds



The Nature Conservancy

to expand their efforts to include the Onion River Watershed, in addition to implementing a monitoring program.

The **Inland Sea Society**, a group of enterprising and enthusiastic residents of the Bayfield Peninsula, established the Sioux River Watershed Council. The Inland Sea Society is a self-sustaining organization that works on projects promoting environmental stewardship through education, recreation, sustainable communities, and planning at the watershed level. This organization can provide fiscal accountability for smaller grassroots organizations looking to establish themselves by applying for funding and taking responsibility for the administrative needs that frequently accompany the funding. Contact information for the Inland Sea Society can be found in the Resource Section.



"Active citizens, landowners and agencies are learning to think differently about the relationships of the Sioux and Onion Rivers to the Lake, community and economy. Watershed thinking is improving coordination, cooperation and citizen involvement."

*Mike Gardner
Sioux River Watershed Resident*

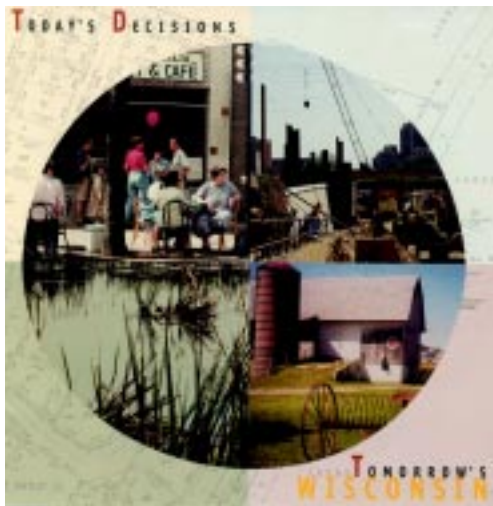
The Role of Elected Officials

“Plans to protect air and water, wilderness and wildlife are in fact plans to protect man.”

Stuart Udall, former Secretary of the Interior for Presidents Kennedy and Johnson

As a person who represents a community, **you play an important role** in the health of your area. Your **leadership is needed** in guiding the vital planning processes required for the community to grow in a responsible manner. If planning isn't done locally, the state will come in and do planning for us. People who are not knowledgeable about the area, its problems, its strengths and its resources will be making the decisions about how our community should grow. It is important to have input from the people who live and work in the region in order to help the area grow in the best manner for everyone.

Responsible planning benefits everyone -- now and in the future. We plan so that our children and grandchildren will enjoy communities, natural resources, and positive ways of life. We plan in a manner that will cause future generations to admire our foresight and our system.



UW-Madison Extension

Planning resources, such as this publication by Brian Ohm (UW-Madison Department of Urban and Regional Planning) can provide assistance.



The Nature Conservancy

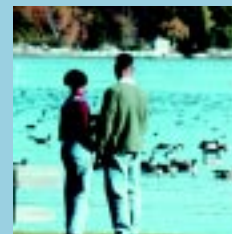
We need to plan together locally, otherwise people who are not knowledgeable about our area will be making the decisions about how our community should grow.

Opportunities for Elected Officials

- Ensure thorough planning for land use -- roads, development, infrastructure, buffers and green space.
- Seek out land use planning initiatives that include state grants to help our local government plan for responsible growth.
- Participate in forums that bring together business leaders, government officials, community members and members of forest-oriented organizations to provide ways and means for addressing problems such as forest fragmentation.
- Look for ways to integrate planning across township boundaries, to include other townships in the natural watershed boundaries.

What are your rights as a property owner? What do you want for your property now, while you own it, and in the future after you pass away? How do the decisions that you and your neighbors make about your property affect the community as a whole? Where should individual property rights end and community rights begin? These are the questions that communities throughout the state will grapple with as they develop their long-term Smart Growth plans.

On the Bayfield Peninsula, the Town of Bayfield has initiated a farmland preservation program to preserve the orchards and farms that produce apples, blueberries, raspberries, honey and cherries which flourish in this unique microclimate on Lake Superior. In their land use plan survey, 81.5% of the Town's residents said the most important thing to them was to preserve the rural character of the township. The Town in partnership with the Bayfield Regional Conservancy, developed a Purchase of Development Rights program that compensates growers for their development rights (the money they would have gotten from development), the grower retains the land, which is permanently restricted for farming or open space purposes. Contact the Bayfield Regional Conservancy at 715-779-LAND or www.brland.org for more information.



University of Wisconsin-Extension

Things You Can Do

Smart Growth, Wisconsin's comprehensive planning law, was signed into law in October 1999. It provides local governments with a definition of a comprehensive plan. According to this definition, a local comprehensive plan includes at least the following nine elements:

- Issues and Opportunities
- Housing
- Transportation
- Utilities and Community Facilities
- Agricultural, Natural and Cultural Resources
- Economic Development
- Intergovernmental Cooperation
- Land Use
- Implementations

The definition provides local governments with a broad policy framework for addressing many of the issues that local governments confront on a daily basis. It also provides reference information to the many resources available that can help communities make informed decisions. Beginning January 1, 2010, any program or action of a local government that affects land use must be consistent with that local government's comprehensive plan. This law was needed because it was found that 69% of all Wisconsin communities did not have any kind of land use plan in place as of 1998. Further, the plans that did exist varied widely in content, quality and age; were rarely updated and often ignored when the actual land use decisions were made.

Call for **Public Participation**: The Smart Growth law requires that local governments foster public participation throughout the process. Much more importantly, YOUR input is wanted and needed in order to make the best decisions for the community in which you live.

Two publications that can provide you with more information are:

[A Citizens' Guide to Land Use in Wisconsin](#)
published by 1000 Friends of Wisconsin

[Planning for Natural Resources](#)
published by University of Wisconsin-Extension and Department of Natural Resources

See Resource Section for contact information for 1000 Friends of Wisconsin and the Department of Natural Resources.

Are you concerned about the future of your property, water quality and the community in which you live? Do you find yourself asking the question, "How can my family and I help out?" In addition to creating and participating in a watershed council, there are many things each of us can do to take part in this important effort of preserving watersheds. In the back of this publication, you will find a list of organizations involved in helping to maintain healthy watersheds. Call one or more of the organizations in your area and find out about their projects and programs. Ask about the date and location of their next meeting. **Everyone** has the potential to **influence watershed management**. Find out how you can be most influential.

If you would like to become more involved with the issues and concerns that affect the Chequamegon Bay area, attend zoning and land use planning meetings or related hearings that may have an impact on water quality or wildlife. Organizations listed in the Resource Section in the back of this publication are involved with issues that affect water and wildlife and are usually aware of public hearing locations and times.

By becoming personally involved in the planning stages, you can help limit the adverse effects of unrestricted development or incompatible forestry techniques along your streams. Land use policies and decisions are often made at local township meetings or city council forums. As a regular attendee at these meetings, you will be able to help shape your community. Call your local township, village or city offices to find out when meetings are held.



Huron River Watershed Council

Everyone has the potential to influence watershed management.

Several of the organizations listed in the Resource section sponsor volunteer activities for local people. Over the past several years, these organizations have sponsored river clean-ups, tree plantings to restore the forested banks of streams and canoe tours for local officials and citizens.

By being a good neighbor and becoming involved with groups concerned about the Chequamegon Bay area or any other watershed, you will take pride in saving not only an important natural resource, but also the key to our local economies, and our communities' way of life.

Opportunities to Improve the Watershed in Your Backyard

Improve your property to reach your personal goals

- If you have a stream, wetland or lake on your land, plant or maintain a buffer. A buffer is an area of trees and other native vegetation located next to water that can provide benefits to landowners in the form of water quality protection, erosion control, stream bank stabilization, enhanced wildlife and aesthetics. Be sure to use native plant species. See the Resource Section for information on buffers.
- Determine what is on your land. What trees, plants and wildlife exist? Does your land have any special geological features such as steep ravines, rocky outcrops or waterfalls? Is there water on your property? Knowing what is on your property will help you develop a management plan and determine which areas need the greatest protection.
- Consider short-term and long-term goals for you and your land. Develop a management plan with a consulting forester or natural resource professional to help you reach your goals. Be an active participant! Once you have a plan, get involved in the management process.
- If your property includes forests, consult a professional forester for assistance. The Department of Natural Resources (DNR) publishes an annual directory of consulting foresters. For a copy, see the Resource Section and contact the DNR Bureau of Forestry.
- Protect and restore wetlands and lowland areas to keep these places from being developed.
- In the Chequamegon Bay area, contact the Living Forest Cooperative – a private landowner cooperative dedicated to sustainable forestry and providing forestry services and land management advice. See the Resource Section.
- Follow Best Management Practices (BMP) guidelines for construction, forestry practices, road construction and farming. Contact the Department of Natural Resources for more information on BMPs.



Mark Dallman, The Nature Conservancy

Opportunities to Improve the Watershed

- Write letters to your elected officials about your concerns for the area.
- Represent your community as an elected official.
- Send a letter to the editor of your local newspaper to share interesting facts about the river or stream where you live.
- Educate others about ways to improve the land and water quality.
- Become a “creek watcher” and adopt a section of waterway to enjoy and monitor.
- Report dumpers, suspicious activities and erosion to local authorities or one of the community organizations listed in the back of this publication.
- Be a resource person for local agency personnel who have the authority to protect your natural resources.
- Become active with area land trusts, such as Bayfield Regional Conservancy, and work with them to protect special areas of land.
- Participate in county shoreland ordinance updates or the lake and water body classification process when it occurs in your county.
- Contact groups are listed in the Resource Section of this publication. An example is The Center for Watershed Protection, www.cwp.org, which has an excellent on-line resource for citizens and elected officials concerned about balancing growth pressures and watershed quality.

Maintain your septic system



Andy Hopfenberger

- Have your septic tank pumped at least once every three years. Biological and septic tank additives are not necessary and do not eliminate the need for pumping. Be aware of the type of septic system you have (mound, holding tank, traditional) and the maintenance needed to keep it functioning correctly.
- Have contractors check the inlet and outlet baffles during septic tank pumping. If they are missing or broken, have them replaced, so they will not leak.
- Have your septic field checked to make sure it is working correctly and not affecting your water supply.
- Do not plant trees in the soil absorption area. Their roots can clog soil absorption fields.

Improve drainage to your urban or suburban yard



Roger Banerman

Rain Garden

- Plant a rain garden, a shallow depression of wild flowers and grasses, to capture surface runoff from roofs and driveways.
- Plant native trees and shrubs to promote infiltration.

- Re-sod bare patches in your lawn as soon as possible. Grade all areas away from your house at a slope of 1% or more.
- Landscape with native species to avoid the spread of invasive, non-native plants.
- Install gravel trenches along paved areas to collect water and allow it to seep into the soil.

Conserve water

- Don't let the water run while shaving, brushing your teeth or washing dishes.
- Wash your car only when it is absolutely necessary and wash it on your lawn instead of on pavement.
- Water your lawn or garden only when it is needed. Never water in midday, when water evaporates quickly.



Sonya Newenhouse

Rain Barrel

- Install a rain barrel to collect rain water and use it for watering your flowers and garden plants.
- Check your faucets for leaks. Those drips could add up to 6,000 gallons a month!
- Only run the dishwasher and washing machine if you have a full load.
- Install water saving devices on faucets, showerheads and in toilets.

Resources



Local Groups

**Bad River Band of Lake Superior Chippewa
Natural Resources Department**
715-682-7123

Bad River Watershed Council
11140 West Edwards Rd.
Saxon, WI 54559

Bayfield Regional Conservancy
715-779-LAND
www.brcland.org

Inland Sea Society
715-373-0674
www.inlandsea.org

Lake Superior Alliance
715-373-0674
www.superioralliance.org

Lake Superior Basin
715-373-6165
www.dnr.state.wi.us/org/gmu/superior/index.htm

Living Forest Cooperative
715-373-0663
www.livingforestcoop.com

Northern Great Lakes Visitor Center
715-685-9983
www.uwex.edu/ces/nglvc

**The Nature Conservancy
Chequamegon Bay Project Office**
715-682-5789
nature.org/wisconsin

Sioux River Watershed Council
715-373-0674
www.inlandsea.org/sioux.php3.htm



Agencies and Organizations

**1000 Friends of Wisconsin and the
Land Use Institute**
608-259-1000
www.1kfriends.org

American Rivers
202-347-7550
www.americanrivers.org

Center for Watershed Protection
410-461-8323
www.cwp.org

Environmental Protection Agency
800-621-8431
www.epa.gov
Surf Your Watershed www.epa.gov/surf
Adopt Your Watershed www.epa.gov/adopt
Model Ordinances to Protect Local Resources
www.epa.gov/owow/nps/ordinance
Financial Assistance
www.epa.gov/owm/cwfinance/index.htm

Great Lakes Indian Fish and Wildlife Commission
715-682-6619
www.glifwc.org

National Park Service
715-779-3397 or 402-221-3471
www.nps.gov

Natural Resources Conservation Service
715-682-9117 or 608-276-USDA
www.wi.nrcs.usda.gov/news

River Alliance of Wisconsin
608-257-2424
www.wisconsinrivers.org

River Network
800-423-6747
www.rivernetnetwork.org

Trout Unlimited
www.tu.org

US Fish and Wildlife Service
715-682-6185
<http://www.fws.gov/>

**US Forest Service, Chequamegon
Nicolet National Forest**
715-362-1300
www.fs.fed.us/r9/cnnf

US Geological Survey
715-682-6163
www.usgs.gov

**University of Wisconsin-Extension
Environmental Resources Center**
715-685-2680 or 715/532-6322
clean-water.uwex.edu

Wisconsin Department of Natural Resources
715-685-2900
www.dnr.state.wi.us

Wisconsin Wetlands Association

608-250-9971
www.wiscwetlands.org



Native Plants, Nurseries, and Landscapers

Environmental Protection Agency

Landscaping with Native Plants
www.epa.gov/glnpo/greenacres/nativeplants

Leaning Pine Native Landscaping Company

715-398-5453
www.restoreshore.com

Native Plant Nurseries and Restoration Consultants

www.dnr.state.wi.us/org/land/er/invasive/info/nurseries.htm

Wild Ones

608-837-6308
www.for-wild.org



Invasive Plant Species

Great Lakes Indian Fish and Wildlife Commission Exotic Plant Information Center

www.glifwc.org/epicenter

Invasive Plant Association of Wisconsin (IPAW)

www.uwex.edu/ces/ipaw

Invasive Species in the Great Lakes Region

734-665-9135
www.great-lakes.net/envt/flora-fauna/invasive/invasive.html

The Nature Conservancy

Wildland Invasive Species Team
tncweeds.ucdavis.edu/esadocs.html

Wisconsin Department of Natural Resources Bureau of Endangered Resources

www.dnr.state.wi.us/org/land/er/invasive

Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants

www.dnr.state.wi.us/org/land/er/invasive/manual_toc.htm



Watershed Resources

Adopt-A-Watershed

530-628-5334
www.adopt-a-watershed.org

Clean Water Network

202-289-2395
www.cwn.org

Community Water Education & Action Opportunities

www.dnr.state.wi.us/org/caer/ce/bureau/education/reslst.htm

Give Water a Hand

800-928-3720
www.uwex.edu/erc/gwah

Know Your Watershed

www.ctic.purdue.edu/KYW

Margin of Error?

Human Influence on Wisconsin Shores
www.dnr.state.wi.us/org/water/fhp/papers/p2



Nonpoint Source Pollution and Stormwater Management

Nonpoint Education for Municipal Officials (NEMO)

860-345-3357
nemo.uconn.edu

Photographs of Best Management Practices (BMPs)

www.epa.gov/owow/nps/ex-bmps.html



Forest Resources

Best Management Practices (BMPs) for Water Quality

608-266-1667
www.dnr.state.wi.us/org/land/forestry/usesof/bmp/bmp.htm

Directory of Consulting Foresters

Wisconsin Department of Natural Resources
Bureau of Forestry
608-266-2289
www.dnr.state.wi.us/org/land/forestry

The Great Lakes Forest Alliance

715-634-2006
www.lsfa.org

National Association of State Foresters

www.stateforesters.org

Wisconsin Woodland Owners Association

715-346-4798
www.wisconsinwoodlands.org

Wisconsin County Forests

715-453-9125
www.wisconsincountyforests.com

Woodland Stewardship: A Practical Guide for Midwestern Landowners

www.extension.umn.edu/
listing_source.html?topic=3&subcat=91



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